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"Semi-subsistence farm households and the non-farm rural economy - Perspectives and challenges"

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Abstract - Semi-subsistence farm households (SFHs) have persevered in Central and South-eastern Europe. An outlook on future perspectives of SFHs asks for reliable information on the phenomenon of SFHs and the impact of policy measures on their development options: (1) intensifying farming, (2) diversifying income creating activities, or (3) exiting farming for waged employment. This article focuses on SFHs and rural non-farm employment (RNFE). On the basis of a comparative 2007-survey of 489 SFHs in Bulgaria, Poland and Romania, three countries with particularly many SFHs, four major types of SFHs (rural pensioners, farmers, rural diversifiers, rural newcomers) were identified. For policy analysis, a multiobjective linear programming household model was developed. In the model, labour can be devoted to (1) farming, (2) self-employment and (3) waged employment. The policy scenarios reflect different development options for SFHs: (1) farm development, (2) start self-employment, (3) farm development and start self-employment, and (4) stop agriculture. Policy can foster the structural change but the modeling results show that fine targeting to the various types of semi-subsistence farms and country specificities is a strong precondition for success.

Keywords - Semi-subsistence, rural non-farm economy, policy analysis, transition countries
JEL Codes: C61, P27, Q12

"Semi-subsistence farm households and the non-farm rural economy - Perspectives and challenges"[1]

1 INTRODUCTION

Semi-subsistence farm households (SFHs) have persevered in Central and South-eastern Europe, although they are often unprofitable from a farm business perspective. Not all reasons for their persistence are understood yet, but it is generally agreed that such households were important in providing food and shelter during economic disruptions of the transition period for both resident families and even urban based relatives. There is an ongoing debate about what could prompt SFHs to intensify farming, diversify income creating activities, or exit farming. Such would foster structural change in the agricultural sector and the rural economy at large. A number of policy measures within the Common Agricultural Policy (CAP) address these issues (Council Regulation No. 1698/2005). An outlook on future perspectives of SFHs asks for comprehensive and reliable information on the phenomenon of SFHs and the impact of policy measures on their development options. This article contributes to the debate on SFHs' future perspectives by discussing and analysing their existing and policy-induced possibilities for rural non-farm employment (RNFE). It is organised as follows: Section 2 briefly summarizes the existing definitions with regard to semi-subsistence farm households and provides an overview of the role of the semi-subsistence agriculture in the EU12. This is followed by a concise outlook on RNFE as livelihood strategy for SFHs in general and specifically in the EU12 (Section 3). On the basis of a comparative survey in Bulgaria, Poland and Romania, countries with particularly many SFHs, Section 4 delineates types of SFHs. Section 5 focuses on the future perspectives of typical SFHs and the impact of policy measures on their choice of employment and cash balance. The paper concludes with the main findings and conclusions in Section 6.

2 SEMI-SUBSISTENCE: DEFINITIONS AND SIGNIFICANCE IN THE EU12

SFHs are a global phenomenon. Yet, the delineation of a common definition of SFH is not trivial. Transition in the new member states of CEE has created a dual farm structure characterised by a relatively small number of corporate and cooperative farms with large contribution to total agricultural production and a large number of small individual or family farms. Corporate farms today are smaller than in socialist time, while individual farms have become bigger over the transition period. Nevertheless, the number of SFHs has remained substantial (Lerman 2000).

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2.1 What characterizes subsistence farming?

A prominent issue in discussing semi-subsistence farming is its definition. It is difficult to clearly distinguish subsistence and commercial farms. Generally, a definition of subsistence farming may depart from three different criteria: *economic size*, *physical measures* and *market participation* (Davidova and Fredriksson 2007).

Physical measures. Physical measures, such as agricultural land, number of livestock, or volume of inputs can also define subsistence through thresholds (Davidova and Fredriksson 2007). Often, the arable land cultivated is chosen, since this indicator is relatively easy to measure. McConnell and Dillon (1997) suggest that a cultivated area of 0.5-2.0 ha might be a good proxy indicator for semi-subsistence farms. However, they agree that land size cannot be adopted as a general indicator, as it is influenced by natural, social and economic conditions. While in fertile, well-irrigated areas one hectare farms might be managed on a commercial basis, in other regions 20-30 ha might ensure the bare survival of the farm household.

Market participation. Doppler (1992) defines farms that sell up to 10% of their production as subsistence farms, those selling 10-90% "transitory" (or semi-subsistence) farms while those selling more than 90% of their production commercial farms. Other scholars (Heidhues and Brüntrup 2002, Mosher 1970, Sarris *et al*. 1999, Todaro 1995) use a 50%-threshold. Subsistence farms are those that consuming more than 50% of their own production.

Braun and Lohlein (2003) propose to consider the purchased input volume in the definition of subsistence farms. In comparison to commercial farms, subsistence farms do not rely much on external inputs in the production process. However, Braun and Lohlein (2003) do not provide any guidelines for empirical analysis.

Economic size. The Farm Accountancy Data Network (FADN) and the EUROSTAT Farm Structure Surveys (FSS) use economic size expressed in European Size Units (ESU)[2] as the criterion for distinguishing subsistence farms from commercial farms. The EU defines a farm below one ESU as subsistence farm (Davidova and Fredriksson 2007). According to the EU, semi-subsistence farms are defined as "agricultural holdings which produce primarily for their own consumption and also market a portion of their output" (EC Regulation 1698/2005, Article 34(1)). However, there is no percentage threshold given with respect to the share of sales of agricultural output in order to differentiate within this group between subsistence farms on the one side, and commercial ones on the other. Based on the EU-definition, the EU10 adopted a rather pragmatic definition of SFHs (Fritzsch, Wegener and Buchenrieder 2008).[3] A semi-subsistence farm household is defined in this article as an agricultural holding of size 1 to 4 ESU that markets a part of its agricultural production.

2.2 Semi-subsistence farms in the EU12

Based on Eurostat, more than 60% of the farms in the EU10 are subsistence farms (smaller than one ESU). In fact, as Table 1 shows, virtually all of the EU12 have a large number of farms at the left side of size distribution. Nevertheless, there is a large discrepancy between the number of these farms and their economic significance. The contribution of 0-4 ESU farms to total ESU reaches nearly 50% only in Romania, whilst in Bulgaria, Lithuania and

[2] The value of one ESU is defined as a fixed number of EUR/ECU of Farm Gross Margin (FGM). Currently, one ESU equals 1,200 €.

[3] Here the borders of the country cases in Sections 4 and 5 are given as examples. In Poland, the agricultural production value has to be within the range of 2 to 4 ESU (MARDP 2007), it is wider in Bulgaria where all farms producing between 1 to 4 ESU (MASF 2007) are classified as SFHs. The broadest limits have been set in Romania where the production value of the farms has to be within 2 to 8 ESU (MARDR 2008).

Latvia, production potential of these farms ranges about 30% of total. In other countries, for instance Poland, their share lies at 10% or lower (Juvančič 2007).

Table 1 Distribution of farms in the EU10 with reference to their economic size, and contribution to overall SGM by various size groups

	Number of farms	Farms by economic size (ESU) in % of total number of farms						
		0-<2 ESU	2-< 4 ESU	4-< 8 ESU	8-<16 ESU	16-<40 ESU	40-<100 ESU	>100 ESU
Bulgaria	534,610	91.8	4.9	1.5	0.7	0.4	0.3	0.3
Czech Republic	42,250	53.7	12.3	9.3	7.8	7.2	4.0	5.7
Estonia	27,750	75.8	11.6	5.7	2.9	2.1	1.0	0.9
Latvia	128,670	85.1	8.4	3.5	1.7	0.9	0.3	0.2
Lithuania	252,950	79.3	14.7	3.6	1.4	0.7	0.2	0.2
Hungary	714,790	87.0	5.7	3.6	1.8	1.2	0.4	0.3
Poland	2,476,470	69.4	11.8	9.2	6.0	2.9	0.5	0.2
Romania	4,256,150	91.0	6.8	1.5	0.4	0.2	0.1	0.0
Slovenia	77,170	48.4	24.8	14.8	7.7	3.7	0.5	0.1
Slovakia	68,490	90.2	3.3	1.8	1.2	1.2	0.9	1.5
	ESU	Percentage contribution to overall SGM according to economic size (ESU)						
Bulgaria	930,920	27.8	7.6	4.9	4.6	6.3	10.8	38.1
Czech Republic	1,532,630	1.2	1.0	1.4	2.5	5.0	6.9	82.0
Estonia	135,400	12.7	6.6	6.5	6.7	10.6	13.5	43.5
Latvia	270,210	27.0	11.0	9.1	8.9	10.0	8.7	25.3
Lithuania	552,280	31.7	17.8	8.8	6.9	7.7	6.7	20.4
Hungary	1,912,560	14.2	6.0	7.4	7.6	10.6	9.9	44.2
Poland	8,264,550	10.9	10.1	15.6	19.9	20.6	8.9	14.0
Romania	4,700,060	49.3	16.3	7.3	4.1	3.9	4.1	14.9
Slovenia	353,950	11.7	15.1	18.0	18.7	19.0	6.7	10.9
Slovakia	519,200	5.7	1.2	1.3	1.8	3.9	7.4	78.8

Source: Juvančič (2007: 52) based on Eurostat (accessed 2007)
Note: ESU = European Size Unit; SGM = Standard Gross Margin

Looking at the gross domestic product (GDP) per capita in NUTS3 regions reveals significant regional differences (Table 2). Regions with low GDP per capita (below 6,000 PPP) are located in Romania, Bulgaria, Latvia and Lithuania. Regions with high GDP per capita (above 15,000 PPP) are the capitals, Cyprus, Malta, parts of the Czech Republic, Slovenia, and Hungary. Above the average EU15 level of GDP per capita (2004: 24,336 EUR at PPP) are only Prague, Warsaw, Budapest, Bratislava, and Ljubljana. There is a clear urban-rural gradient. As Map 1 clearly shows, regions with a high percentage of farming are among those with lower income levels. But is it that simple? If one clusters the 175 rural NUTS3 regions of the EU12, more differentiated picture arises and five regional rural clusters emerge (Baum 2008b and see Map 2)[4]:

(1) Backward agrarian regions: These regions show very low incomes (5,458 EUR at PPP on average), a pronounced subsistence orientation (92% of all holdings <2ESU on average) and a strong population decrease (annually -1.9% on average, 2000-05).

[4] Five variables on NUTS3 level have been chosen for classification: (1) Change of population 2000-2005; (2) GDP per capita 2004; (3) Change of GDP per capita 2000-2004; (4) Share of employment in industry and services 2004; (5) Share of holdings <2 ESU 2005 (Baum 2008b).

(2) Dynamic agrarian regions: The regions show low incomes (6,586 EUR at PPP), also a pronounced subsistence orientation (90% of all holdings <2ESU on average), but the highest annual change rate of GDP per capita among all groups (annually +11.3%, 2000-04).

(3) Intermediate regions: The regions display middle-incomes (8,609 EUR at PPP on average) with subsistence agriculture below average (57% of all holdings <2ESU on average) and lowest annual change rate of GDP per capita among all groups (annually +4.5%, 2000-04).

(4) Advanced regions: These regions are rather diversified (87% of employed in industry and services on average), are middle-income regions (9,414 EUR at PPP), and subsistence agriculture is above average (85% of all holdings <2ESU on average).

(5) Best performing regions: These regions are diversified (93% of employed in industry and services on average), have the highest per capita income (15,301 EUR at PPP on average), the lowest degree of subsistence agriculture (54% of all holdings <2ESU on average) and a stable population (average annual change rate +0.07%, 2000-05).

By way of summary, higher levels in diversification are generally associated with higher regional incomes. It also offers better opportunities for overcoming structural change and stimulating new economic activities. Nevertheless, even rural 'advanced regions' or the 'best performing regions' face structural challenges with regard to the large number of small (semi-subsistence) farms. Also it should be pointed out that it is not clear whether the higher diversification is deriving from demand-pull or distress-distress push factors.

Table 2 GDP in Euro per capita in PPP by NMS10 and OECD categories, 2004

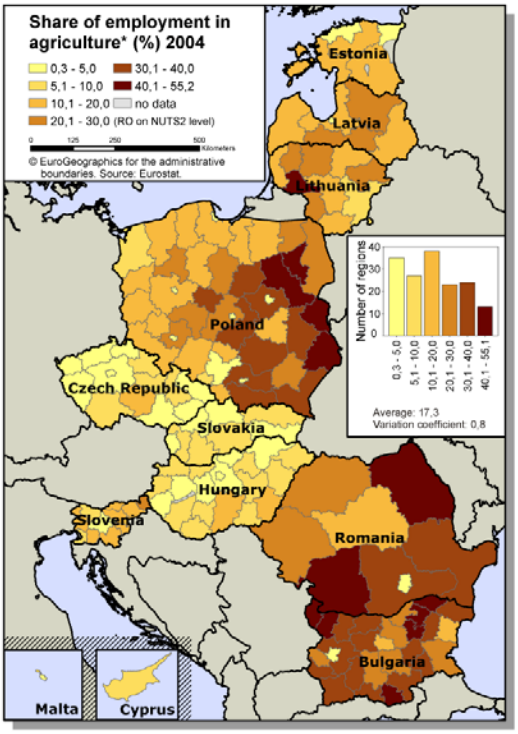
	PR	SR	PU	All
Bulgaria	5537.4	6107.6	13599.3	7133.8
Czech Republic	13370.6	13916.6	33753.2	16156.9
Estonia	7661.0	13455.4	7192.2	12037.0
Hungary	9752.4	11885.7	28232.1	13751.3
Latvia	5664.1	6426.6	17920.9	9775.1
Lithuania	7603.5	10066.8	15755.6	10982.7
Poland	8621.3	9144.2	17738.4	10907.8
Romania	5781.2	7271.2	14417.4	7296.8
Slovakia	10366.6	10184.0	27799.3	12196.1
Slovenia	15189.9	21646.0	…	17922.2
Total	8107.2	9994.4	19287.0	10939.6

Source: Baum's (2008a: 20), calculation based on Eurostat Regio data

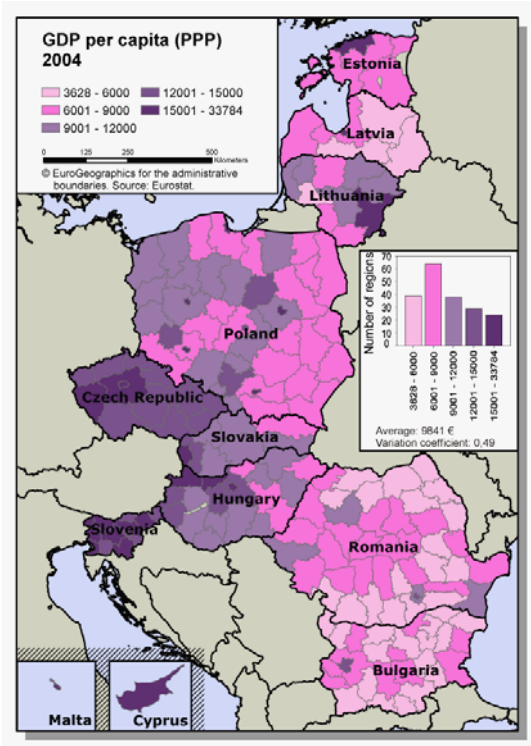
Notes: Predominantly rural regions (PR): if more than 50% of the population is living in rural communes (with less than 150 inhabitants per km^2)
Significantly rural regions (SR): if 15% to 50% of the population is living in rural communes (with less than 150 inhabitants per km^2), and
Predominantly urban regions (PU): if less than 15% of the population is living in rural communes (with less than 150 inhabitants per km^2).
… = this category does not exist for this country

Map 1 Farm employment and per capita income in NUTS3 regions of the EU12

Map 1.1 Share of employment in agriculture (2004)

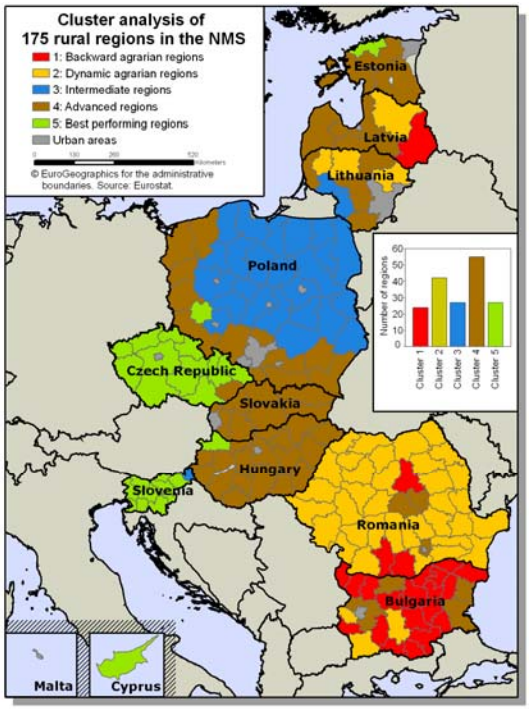


Map 1.2 GDP in Euro per capita (PPP 2004)



Source: Baum (2008a: 19 & 26)

Map 2 Regional rural typology, 175 rural NUTS3 regions in the EU12



Source: Baum (2008b: 11)

3 NON-FARM EMPLOYMENT AS LIVELIHOOD STRATEGY FOR SEMI-SUBSISTENCE FARMS

Livelihood encompasses the ways and means of making a living. Well functioning rural labour markets are essential for the livelihood of the people in rural areas, those employed in agriculture and outside of it. Similarly to the EU15 in the 1960s and 1970s, the rapid economic development in the accession countries from CEE is associated with a declining share of agricultural employment. However, in contrast to the EU15, agriculture remains an important source of income for many rural households, particularly in the poorer EU12 countries (Buchenrieder et al. 2007). Nevertheless, empirical research on RNFE seems to suggest that farm households, particularly the members of SFHs, are pluriactive and depend substantially on income from these non-farm activities (Lanjouw and Lanjouw 2001, Buchenrieder 2005, Möllers and Buchenrieder 2005, Möllers 2006, Haggblade et al. 2007, Reardon et al. 2007, and Winters et al. 2007).

3.1 Non-farm employment as livelihood strategy for semi-subsistence farms

Diversification and non-farm employment are an integral part of rural livelihood strategies. Diversified incomes are a main characteristic of farm households all over Europe (Table 3). The rural non-farm sector accounts for around 40-60% of rural household income all over the world (Davis et al 2009). The sector is highly heterogeneous and can be crudely divided into four subsectors comprising (1) local non-farm employment opportunities (regular salaried employment, casual wage labor, and self-employment), (2) urban employment with daily commuting, (3) intra-national or international temporary and permanent labour migration, and (4) unearned income from pensions and other transfer payments (Buchenrieder 2005, Möllers and Buchenrieder 2005, Möllers 2006).

Box 1 Working definition for 'employment diversification' and 'pluriactivity'

Employment diversification is a dynamic socio-economic process in which rural households widen the range of income sources in their income portfolio. Such diversified incomes are usually based on a mix of farm and non-farm incomes. Employment diversification leads to an increase in the number and mix of income sources. Thus, employment diversification rises with the number of income sources, the equity of their distribution, and their dissimilarity. In other words, a household with three income-generating activities is more diversified than a household with two income generating activities; and a household with two activities which use 50% of the labour input is more diversified than a household in which the labour input allocation is 90%:10%. Moreover, the diversification level increases if the income sources are not of the same type.

The term ***pluriactivity*** is used to describe a situation in which an individual pursues more than one income-generating activity or, respectively, the number of income generating activities in a household exceeds the number of active household members.

Sources: Möllers (2007: 37) based on Ellis (2000), Minot (2003) and Möllers (2006)

Start (2001: 496) emphasizes that NFRE is very diverse; it is "highly lucrative at the top end with mainly formal wage employment and modern capitalized enterprises, but very menial at the bottom […]". In accordance with this statement, two directions of diversification are distinguished in the discussion on labor force shifts from agriculture to the rural non-farm sector: the demand-pull and distress-push direction. Often, the initial motivation of diversification into the rural non-farm sector is distress-driven. However, if the economic environment is favourable, non-farm employment could also pull well-educated labour force out of the farm sector and thus further farm exit rates and structural change. Successful rural development policies depend to a high degree on the rural non-farm sector. Only if the labour force that has to be released from the agricultural sector can be absorbed elsewhere will the farm structures reach viable sizes and will the productivity in agriculture increase. Therefore, labour markets and targeted policies on rural non-farm enterprises are needed (Möllers 2007). Box 1 summarizes working definitions for 'employment diversification' and 'pluriactivity'. A summary of existing theories and modeling approaches of non-farm diversification can be found in Möllers and Buchenrieder (2005).

3.2 Employment diversification of farm households in the EU12

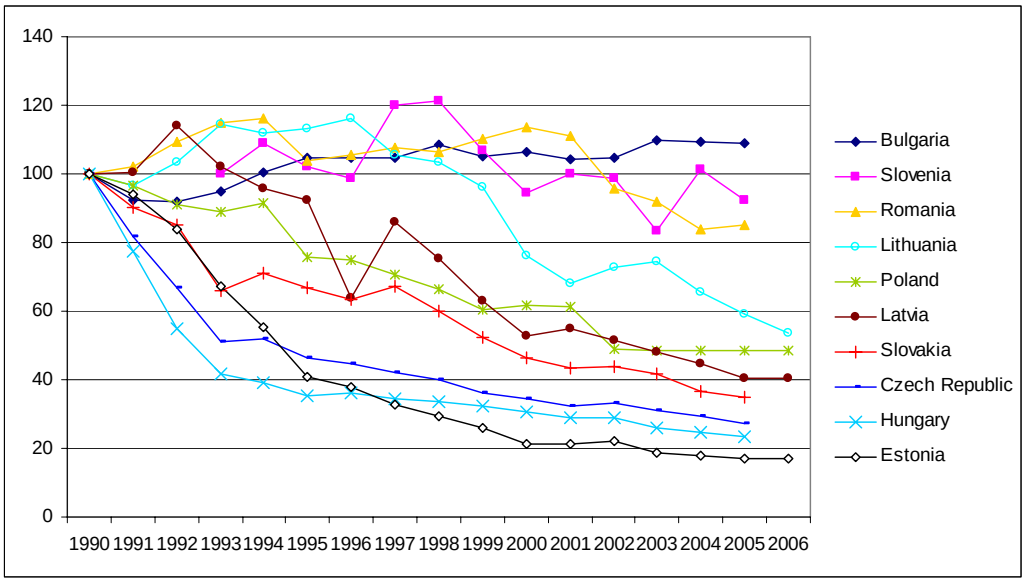
In about one fifth of 175 NUTS3 regions in the NMS, agriculture accounts still for around one third of employment. Regions with high agricultural employment are located in Romania, Bulgaria, Poland and Lithuania (see Map 1). Unsurprisingly, the agricultural employment increases with the degree of rurality in all countries.

Yet, the restructuring process during transition has led to a dramatic transformation of the agricultural workforce. In Hungary, the Czech Republic, Slovakia and Estonia, there was a significant slump in agricultural employment in the first years of the 1990s, with annual average change rates of -10% to -30%, coinciding with a consolidation of large scale farm structures and the release of non-family labour. This was followed by a more stable period, but with an annual decrease still exceeding that in the EU-15, until about 2000 (Figure 1). In Poland, where in comparison to the other CEE countries, farm restructuring was less pronounced, since family farms had already been the predominant farm type prior to transition, the agricultural labour force was much less reduced. In Bulgaria, Romania and Slovenia until about 1998-2000, and in the first years of transition also in Latvia and Lithuania, there was an observable increase in agricultural employment. This reflects the creation of small family farms arising from the land privatisation process, migration from urban to rural areas and (semi-) subsistence agriculture acting as social buffer during the development of a more market orientated economy. The EU accession in 2004 and the CAP introduction seem to have had so far a rather minor overall impact on agricultural employment in the NMS.

Part-time farming plays an important role in agriculture of the EU10. In 2005, only 8% of the employed persons on farms worked full-time (compared to 23% in EU15), and 50% of the agricultural workforce was employed less than 25% of the time available for a full time worker. However, there are big differences between countries (see Figure 2). Most of the EU12 have high shares (above 80%) of part-time farming. Another indicator for part-time farming is the comparison of agricultural employment expressed in persons with that expressed in annual work units (AWU).[5]

[5] An annual working unit (AWU) corresponds to the work performed by one person who is occupied on an agricultural holding on a full-time basis. "Full-time" means the minimum hours of work required by the national provisions governing contracts of employment, normally 1800 hours, i.e., 225 working days of 8 hours each.

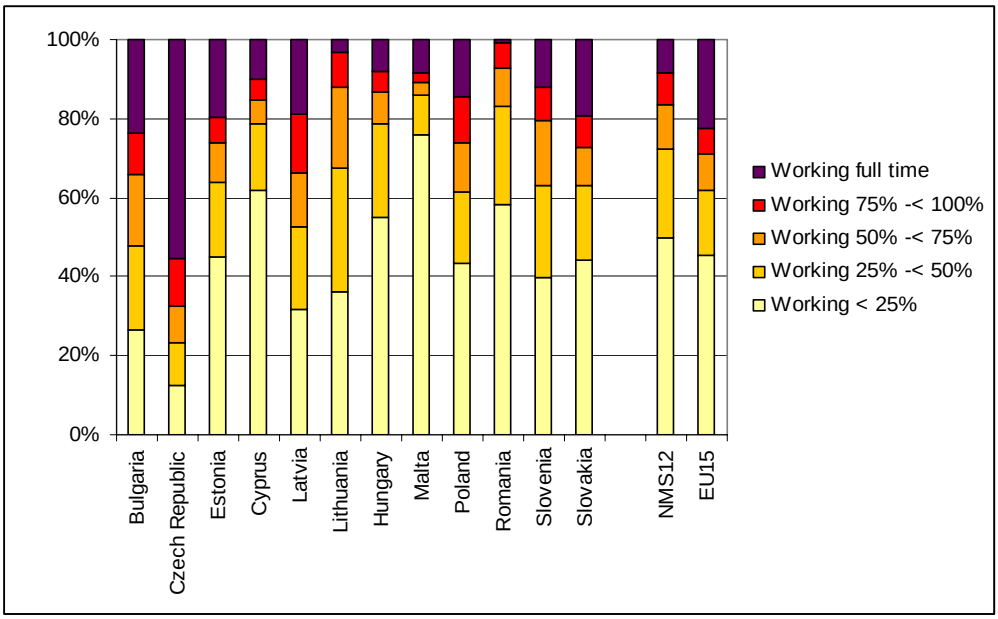
Figure 1 Development of employed persons in agriculture[1)] in the EU10, 1990-2006 (1990=100)[2)]



Source: Baum (2008: 29)

Note: [1)] Including hunting in the Czech Republic, Estonia, Latvia, and Slovenia; including hunting and forestry in Bulgaria, Lithuania, and Romania; including hunting, forestry and fishery in Hungary, Poland, and Slovakia. [2)] Slovenia: 1993=100.

Figure 2 Share of full-time and part-time work of the regular labour force in agriculture in the EU12, 2005



Source: Baum (2008: 32)

Differences between persons and AWU are greatest for "other family members" (indicating a high share of part-time work particularly of the younger generation). Analysis for the EU25 showed also that women work more often part-time than men (Copus et al. 2006). Most studies consider part-time farming as a first step out of agriculture, i.e., a high share of part-time farming goes hand in hand with diversification and pluriactivity and may lead eventually

to increasing farm exits. However, there is also evidence that part-time farming and non-farm diversification can be a stabilising factor of employment (Breustedt and Glauben 2007, Bojnec, Dries and Swinnen 2003).

Non-farm diversification tends to absorb underemployed farm household labour (and thereby to reduce hidden unemployment). Eurostat data of 2005 (see Table 3) reveals that the share of agricultural holdings with other gainful activities[6] in the EU12 was on average 13% (compared with 10% in the EU15). However, this figure is strongly influenced by the huge number of small holdings with other gainful activities, for instance in Romania (22%). In all other countries, this share does not reach 10% with the exception of the Czech Republic (11%). It is particularly low in Lithuania (1%), Bulgaria, Slovakia (both 2%), Slovenia, and Malta (both 4%) (Table 3 and Map 3). From Table 3 it is evident that non-farm employment is not a phenomenon of small or large farms. It seems that any size category is somehow engaged in non-farm employment. Nevertheless, non-farm employment may be more important for smaller farms as the share of income from non-farm employment in total farm income can be relatively substantial and this can act as a risk balancing mechanism.

One of the most cited and most obvious forms of on-farm diversification is agritourism[7]. In the EU12, many hopes have been connected with tourism for the development of rural areas. However, only 0.2% of holdings in the EU12 have diversified into tourism (compared with 2% in EU15). A similar situation can be assumed for overall rural tourism (not only on farms, but including hotels, guesthouses, holiday dwellings, campsites in rural areas). The tourism intensity, i.e. the number of overnight stays per inhabitant in 2005, was in most of the NUTS2 regions in the EU12 below 2.5 (see Map 3, Map3.2).

An indicator for entrepreneurs can be partly the share of self-employed people. Self-employment rates increased in recent years in the EU12, approaching the level of the EU15. They are particularly high (>20%) in Romania, Poland and Cyprus and very low (<10%) in Estonia and Latvia. Rural areas show often higher rates of self-employment than urban areas. However, many self-employed may not act innovatively or exhibit strong growth since they act out of distress-push instead of demand-pull reasons. Furthermore, self-employed people contain in many countries a high share of farmers, partly explaining the high rates in Poland and Romania which have a high share of small farm holdings (Baum 2008a).

Eurostat figures seem to suggest, on the one hand, that part-time farming and self-employment are dominant features in the EU12. On the other hand, the Eurostat figures with regard to gainful activities are rather low. Nevertheless, results from smaller sectoral surveys point to a high share of non-farm income in total rural incomes which vary from 15-68% (see Table 4). [8] Davis et al. (2007) confirm this estimate and put a global figure of non-farm income at approximately 58% of total rural income.

[6] This includes tourism, handicraft, processing of farm products, wood processing, aquaculture, renewable energy production, contractual work, and others.

[7] The terms agritourism, agrotourism, farm tourism, or rural tourism are not uniformly defined. The term rural tourism is most commonly used for the *total* tourism in rural areas outside of specialised (coastal, mountainous or urban) tourist resorts. Agritourism, agrotourism, or farm tourism is a small part of rural tourism and includes the tourist offers on agricultural holdings (e.g. Bojnec 2004, Hegarty and Przezborska 2005).

[8] For reviews of empirical research on RNFE see Lanjouw and Lanjouw (2001), Buchenrieder (2005), Möllers and Buchenrieder (2005), Haggblade et al. (2007), Reardon et al. (2007), and Winters et al. (2007).

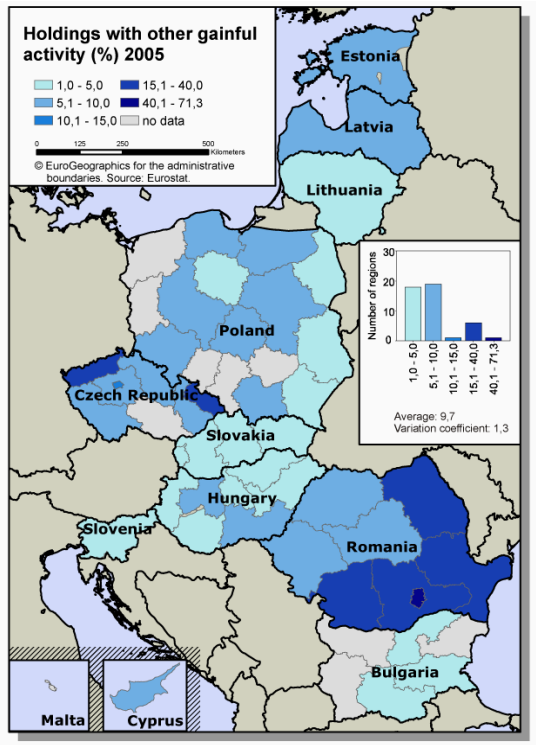
Table 3 Share of agricultural holdings with other gainful activities in EU12, by agricultural area in hectare, 2005

Country	0*	0-2	2-5	5-10	10-20	20-30	30-50	50-100	>=100	Total
Bulgaria	1.1	1.0	4.9	10.5	17.9	20.4	26.3	19.2	32.5	2.1
Cyprus	15.6	3.7	7.6	9.0	14.2	16.3	16.7	28.0	27.3	5.6
Czech Republic	9.3	7.3	8.7	10.8	12.1	12.2	15.2	13.5	19.0	10.6
Estonia	16.7	3.7	3.9	5.0	6.6	9.7	13.8	16.8	23.5	6.7
Hungary	4.1	3.4	8.9	11.4	13.6	17.3	17.5	16.3	28.3	5.1
Latvia	11.1	5.6	4.6	7.1	11.2	15.1	20.4	26.6	32.1	8.5
Lithuania	16.7	1.5	0.7	0.7	1.0	1.6	2.2	3.2	6.5	1.0
Malta	10.5	2.8	15.5	20.0	33.3	-	-	-	-	4.4
Poland	4.5	4.5	6.3	6.0	6.0	6.4	7.6	10.7	21.2	5.4
Romania	17.2	19.7	27.3	26.6	27.3	31.5	34.4	39.0	33.8	22.1
Slovakia	3.3	0.3	2.5	8.9	13.3	15.4	18.6	17.5	29.8	2.3
Slovenia	0.0	1.5	2.2	4.8	10.1	14.6	18.1	14.3	20.0	4.1
EU12	12.2	12.1	17.5	13.1	10.0	10.3	12.6	16.8	26.3	13.3
EU15	13.4	5.1	6.7	9.8	13.0	15.8	17.9	19.7	23.1	10.0
EU25	9.2	4.5	6.2	8.1	10.7	13.9	16.8	19.2	23.1	8.1
EU27	12.5	10.2	13.2	11.5	11.8	14.4	17.1	19.5	23.5	12.0

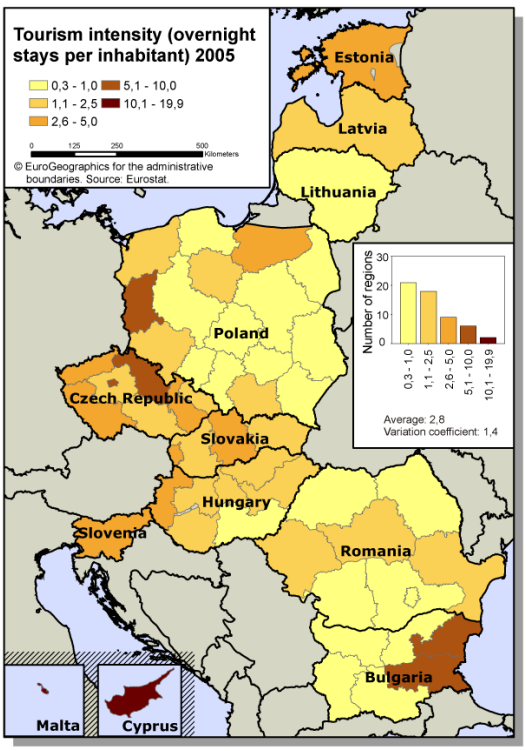
Source: Eurostat (accessed 2009)
Note: * Agricultural holdings without agricultural land, for instance shepherds.

Map 3 Agricultural holdings with other gainful activity in NUTS2 regions of the EU12, 2005

Map 3.1 Percentage share of agricultural holdings with other gainful activities



Map 3.2 Tourism intensity



Source: Baum (2008: 38)
Note: Average and variation coefficient unweighted.
Tourism intensity of Romania: Number of overnight stays 2006 per inhabitants 2005.

Table 4 Diversification among small-scale farms

	Share of small-scale farms with non-farm income (%)	Share of non-farm income in total rural household income (%)
Albania	31-38	n.a.
Bulgaria	35-42	40-67
Czech Republic	n.a.	15
Hungary	53-56	17
Macedonia	74	50
Poland	56	60-63
Romania	29-41	60-74
Slovakia	n.a.	20
Slovenia	69	43-45

Source: Fritzsch and Wolz (2007: 2) based on multiple sources.

Note: The figures are mostly derived from smaller sectoral surveys. n.a. = not available

Hopes that the urban-rural labour market disparities in the CEE countries could diminish soon through the traditional channels of migration, wage flexibility and capital mobility are rather bleak. Migration is too low[9] to be able to balance regional disparities in income and unemployment. Furthermore, regions with poor economic performance show often the lowest non-farm diversification rates due to structural reasons and subsequent high inter-sectoral and inter-regional shifting costs (e.g. low educational level and poor non-farm employment opportunities; scarce financial means to move). Commuting is also too weak to compensate for low migration. Transport costs severely constrain the commuting distance of unemployed workers (Fidrmuc 2004, Huber 2007).

The above discussion has shown that semi-subsistence farms in the EU12 are highly dependent on non-farm income to sustain their livelihoods. Yet, semi-subsistence farms are not a homogeneous group and the micro and meso determinants of their participation in RNFE can vary strongly.

4 MAJOR TYPES OF SEMI-SUBSISTENCE FARM HOUSEHOLDS IN BULGARIA, POLAND AND ROMANIA[10]

The heterogeneity of SFHs makes policy decisions difficult, particularly because research results indicate that semi-subsistence farmers are not very responsive to market and policy signals that would normally lead to farm intensification, diversification or exit (Mathijs and Noev 2002, Kostov and Lingard 2004). Rather, SFHs try maintaining a status quo when it comes to land and animals and diversify income to improve their livelihood. On the basis of a comparative survey in Bulgaria, Poland and Romania, three countries with particularly many SFHs, major types of SFHs are identified. SFHs, e.g. farms of size 1 to 4 ESU make up about one quarter of farms in Poland (25.0%) and Romania (27.6%). They are less important in

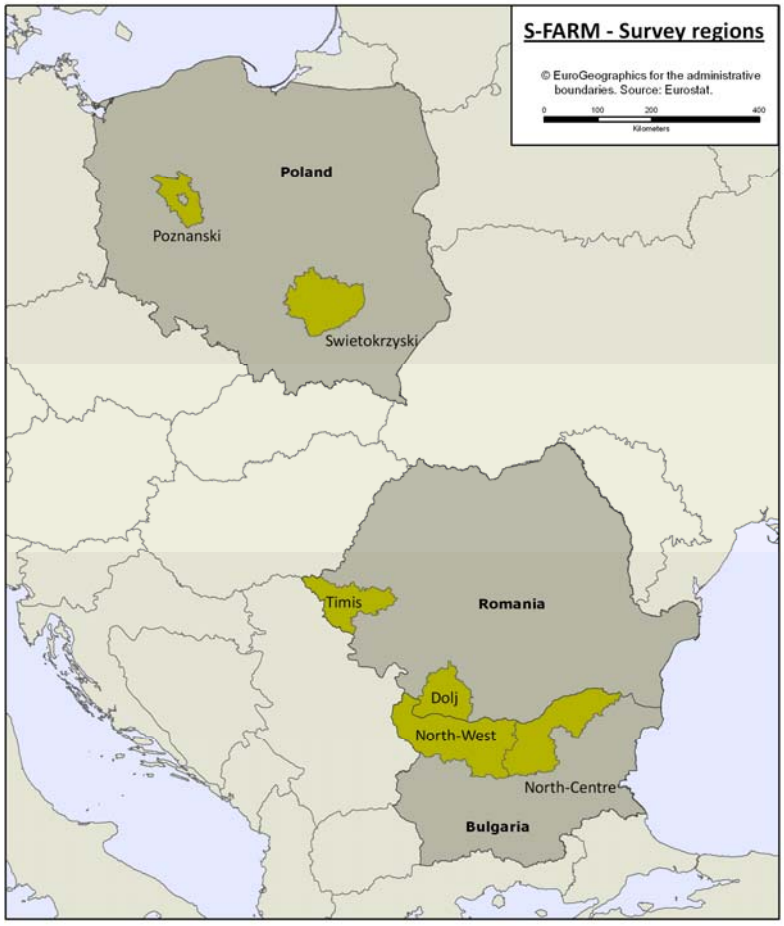
[9] Generally, in most transition economies (with the exception of the Baltic States and Romania) inter-regional migration is lower than in EU15 labour markets and has fallen during transition. Possible reasons for this phenomenon are a combination of liquidity constraints, housing market imperfections, low educational level, and poor employment opportunities of potential migrants (Fidrmuc 2004, Huber 2007). A look at the regional net migration rate reveals a negative rate in the majority of EU12 regions. This is most pronounced in Bulgaria, Lithuania, and parts of Poland (Baum 2008a).

[10] For detailed information on the methodological approach for identifying the major types of SFHs, see the final report of the S-FARM project, specifically Fritzsch, Wegener and Buchenrieder (2008).

Bulgaria with less than one fifth of farms (19.0%). Together, about 1.9 million of farms can be rated to be semi-subsistent in the three countries.[11]

Because SFHs are playing an important role in these three countries, they were selected for the establishment of a cross-country database. The surveys were performed in 2007 in two regions in each country (see) : (i) Świętokrzyski and Poznański in Poland, (ii) Timis and Dolj in Romania, and (iii) North-West and North-Centre in Bulgaria. At least ten villages were selected within each region. The pooled sample contained 489 observations: 158 from Poland, 153 from Romania, and 178 from Bulgaria. Data refer to the year 2006.

Map 4 S-FARM survey regions in Bulgaria, Poland and Romania



To assess the future perspectives of SFHs and to target them by policy measures, clusters of SFHs were identified that represent major types of SFHs. Four major types of SFHs could be identified (see web diagram in Figure 3): (1) rural pensioners, (2) farmers, (3) rural diversifiers, and (4) rural newcomers. Appendix-Table 1 provides descriptive statistics and the result of the Kruskal-Wallis test for the 13 variables in the cluster analysis.

(1) Rural pensioners. Rural pensioner households (N=83) display the highest average age of farm operators as well as the highest dependency ratio. They receive the highest share of social security benefits and lowest non-farm income in household net income as compared to the other types. They operate the smallest farms but have many years of experiences in managing a farm although they are not well trained.

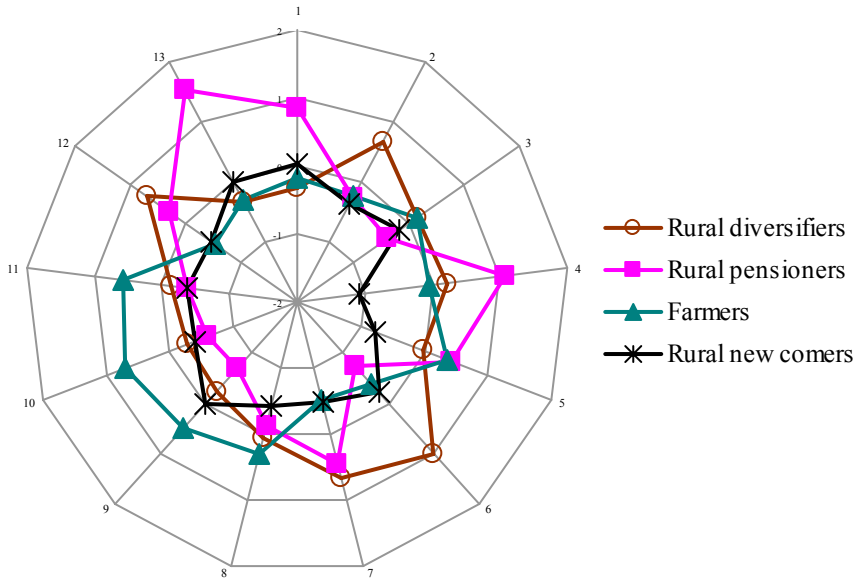
[11] In the EU12, 66.2% of all farms are below 1 ESU (subsistence farms), 25.5% are between 1 to 4 ESU (SFHs).

(2) Farmers. The farmers (N=153) cultivate the largest farms and the subsistence rate is low. Obviously they are better integrated into the market than farms in other clusters. It is also worth mentioning that the households of farmers had the highest annual household cash balance among the SFHs.

(3) Rural diversifiers. The rural diversifiers (N=150) are characterised by the highest share of non-farm revenues in household net income and the highest level of formal schooling that may well be a precondition for the non-farm employment. The rural diversifiers display the highest subsistence rate and produce a great variety of agricultural products to meet the family demand.

(4) Rural newcomers. Members of the rural newcomer households (N=103) are the youngest and have very little experience as farm managers. They had the lowest annual household cash balance and their level of formal schooling was very low. It appears that this cluster has a large scope for improving its socio-economic situation. The low age and lesser experience in agriculture resulted in naming the group rural newcomers.

Figure 3 Web diagram for major clusters of SFHs



Notes: Names of axes: 1: dependency ratio, 2: highest formal schooling in the household, 3: agricultural qualification of farm operator, 4: age of farm operator, 5: farm operator's experience as farm manager, 6: share of non-farm net income in household net income, 7: share of own used agricultural production in total agricultural production, 8: household cash balance, 9: economic farm size, 10: cultivated agricultural area (ha), 11: share of crop production in total agricultural production, 12: number of agricultural products, 13: share of social security benefits in household net income.

5 LIVELIHOOD STRATEGIES OF SFHS AND POLICY IMPLICATIONS[12]

Modelling the transition process from subsistence to market-oriented production has not only to take into account the production factors but also other characteristics of the SFH, such as preferences for a certain way of life. This may cause SFHs to keep a certain degree of self-

[12] For detailed information on the methodological approach for policy analysis and modeling results see the final report of the S-FARM project, specifically Fritzsch, Wegener and Buchenrieder (2008).

sufficiency even at the cost of income losses. Therefore, a multiobjective linear programming (MOLP) model (see Section 5.1) is used to consider multiple objectives which may be relevant for SFHs in determining their livelihood strategy. Furthermore, policy measures are modelled and their impact on households' labour allocation (see Section 5.2) and cash balances (see Section 5.3) is evaluated. Section 5.4 shows whether household's philosophy of life and its constraints markedly influence model results.

5.1 Methodological approach for policy analysis

SFHs follow more objectives than solely maximising farm profit. To consider the SFHs' numerous objectives and make thus the policy analysis more realistic, a MOLP household model was developed and implemented (in GAMS). The farm household model considers three income activities as decision variables with their operational costs and labour inputs: (1) farming and non-farm labour, the latter are (2) self-employment and (3) waged employment. The labour input can be satisfied by household and hired labour. The following four objective functions are included in the model:

1. Maximising net agricultural production: This objective represents the household's preferences for agricultural production due to aims like food security or tradition.
2. Maximising net non-farm income: This objective considers preferences of the household for the development of additional income sources or to reduce its dependency on farming.
3. Maximising household's cash balance: This objective shows directly whether the household will have a positive cash balance thus being able to cover all expenditures and save some money for future needs or not under the respective scenario.
4. Minimising agricultural labour use: This objective might be of relevance for households which seek to maintain agriculture on a certain level due to tradition or for food security, but which are also considering pluriactivity, or try to reduce agricultural labour input due to a high age.

The necessary weights of the single objectives were assessed based on survey results and expert interviews. The simulation was carried out for one real household per major type and country, in total 12 households. The impact of four policy measures was assessed by modelling the policy scenarios given in Table 5:

1. Single Area Payment Scheme (SAPS),
2. Farm investment support for the modernisation of agricultural holdings,
3. Support for diversification into non-farm activities[13],
4. Early retirement support.

A **baseline scenario** is understood as the situation in 2016, when direct payments are fully implemented, i.e. to 100% of agreed payments, in all three surveyed countries. The policy scenarios reflect different policy supported strategies of the identified SFH types. The scenario **"farm development"** presumes that the household will invest in farming activities. In the scenario **"start self-employment"** it is assumed that the household will start a self-employed activity other than farming. The scenario **"farm development and start self-employment"** assumes that the household invests into farming and diversifies into self-employed activities at the same time. All assumptions of the single scenarios "farm development" and "start self-employment" are applied. The scenario **"stop agriculture"**

[13] Self-employment rates are higher in the NMS than the EU15. They are particularly high in Romania and Poland (see Section 3.)

presumes that the farm operator stops farming activities and receives respective payments from the early retirement scheme.

The model takes the households' philosophy of life explicitly into account. High preferences for farming and waged employment are implemented by setting lower bounds on the activity levels thus stopping agriculture or ceasing waged employment is not possible. The model will always allocate a certain amount of capacities to these activities even when this means losses in income or decreasing household's cash balance. This is in contrast to standard models in which income or production is maximised only.

Table 5 Scenarios for policy analysis with regard to SFHs

Scenarios	Policy measures			
	SAPS	Farm investments	Diversification support	Early retirement
Baseline	×			
Farm development	×	×		
Start self-employment	×		×	
Farm development and start self employment	×	×	×	
Stop agriculture				×

Policy measures ask for constraints. In the farm development scenario, households have to continue their farming activities at least at the level of 2006. Starting self-employment is modelled by allocating a minimum level of household labour (0.5 AWU = 900 hours of labour) to this activity. In addition, the household must hire paid labour. Upper bounds show households' constraints. Upper bounds on labour capacities for the income activities are set according to the number of economically active household members, their age and education. The upper bound for farming depends on the strategy. In farm development scenarios, households may expand their cultivated land by 100%. In all other scenarios, the household cannot operate more land than it did in 2006.

The analysis presented here concentrates on the impact of the policies on the labour allocation to the farm and non-farm sector as well as on the cash balance with regard to the SFH-scenarios.

5.2 Impact of policy measures on household's labour allocation

Policy impact in the form of structural change materialises in factor allocation shifts. The model provides information on labour allocation to farming, self-employment and waged employment with regard to the policy measures. The baseline scenario depicts labour allocation without policy interventions. In the following the situation in the year 2016 without policy intervention is compared to the observed situation in 2006. Then the impact of farm investments, diversification support, and early retirement transfers are analysed.

Without policy measures, seven out of the twelve modelled SFHs (58%) will maintain their present labour allocation (Table 6). However, five households (42%) reallocate labour from farming to waged employment. Among them, one household (Polish rural diversifier) stops farming and also its self-employed activities and reallocates all its labour to waged employment. For the other four households, three downsized their farms and for one household technical progress reduced the necessary labour for farming. This indicates that

without policy interventions there would be still structural change though it would be slow. Only when the emotional ties to agriculture are weak and the household members have good opportunities to work in the non-farm sector, farming will be abandoned.

The simulation results for changes in labour allocation due to policy measures are presented in Table 7. The results are not straightforward for the farm development scenario. Only five households (42%) reallocate labour to farming activities by reducing their waged employment. Four households (33%) would not change their labour allocation although investing into farming and three households (25%) would even reduce their labour input in farming. The strategy of the latter households would be to invest in farm labour productivity and pay 900 hours of work[14]. This would result in cutting down household farm labour and using it instead in waged employment.

Table 6 Baseline scenario: Changes in labour allocation

	Changes in SFH labour allocation with regard to …		
	farming	self-employment	waged employment
Rural Diversifier			
Bulgaria	+-	+-	+-
Poland	-	-	+
Romania	-	+-	+
Rural Pensioner			
Bulgaria	+-	+-	+-
Poland	-	+-	+
Romania	+-	+-	+-
Farmers			
Bulgaria	+-	+-	+-
Poland	+-	+-	+-
Romania	+-	+-	+-
Rural Newcomer			
Bulgaria	+-	+-	+-
Poland	-	+-	+
Romania	-	+-	+

Notes: +: Household allocates in 2016 more labour to the income activity than in 2006. -: Household allocates in 2016 less labour to the income activity than in 2006. +-: No changes in household's labour allocation in 2016 compared to 2006.

Starting a non-farm business should result in the reallocation of family labour. All households that operate a farm in the baseline scenario reduce labour input into farming and seven households (58%) also reduce their wage employment (Table 8). Among those five households (42%) that do not alter their wage labour input with regard to the baseline scenario, three are not yet engaged in waged employment and two would continue their wage job up to their labour capacity for this activity.

[14] According to the model parameters, households have to hire 900 hours of paid labour (equivalent to 0.5 AWU) in the scenarios "farm development", "starting self-employment" as well as "farm development and starting self-employment".

Table 7 Farm development scenario: Changes in labour allocation

	Changes in SFH labour allocation with regard to …		
	farming	self-employment	waged employment
Rural Diversifier			
Bulgaria	+	+-	-
Poland	+	+-	-
Romania	+	+-	-
Rural Pensioner			
Bulgaria	-	+-	+
Poland	+-	+-	+-
Romania	+-	+-	+-
Farmers			
Bulgaria	-	+-	+
Poland	+	+-	-
Romania	+-	+-	+-
Rural Newcomer			
Bulgaria	+	+-	-
Poland	-	+-	+
Romania	+-	+-	+-

Notes: +: Household allocates more labour to the activity than in the baseline scenario. -: Household allocates less labour to the activity than in the baseline scenario. +-: No changes in household's labour allocation compared to the baseline scenario.

Table 8 Self-employment scenario: Changes in labour allocation

	Changes in SFH labour allocation with regard to …		
	Farming	self-employment	waged employment
Rural Diversifier			
Bulgaria	-	+	-
Poland	+-	+	-
Romania	-	+	-
Rural Pensioner			
Bulgaria	-	+	+-
Poland	-	+	+-
Romania	-	+	+-
Farmers			
Bulgaria	-	+	-
Poland	-	+	-
Romania	-	+	+-
Rural Newcomer			
Bulgaria	-	+	-
Poland	-	+	-
Romania	-	+	+-

Notes: +: Household allocates more labour to the activity than in the baseline scenario. -: Household allocates less labour to the activity than in the baseline scenario. +-: No changes in household's labour allocation compared to the baseline scenario.

If a SFH is modelled such that it is developing its farm simultaneously to starting a non-farm business, it puts tremendous pressure on the labour demand. The labour for the self-employed activity could come from reducing waged employment but also from investing in farm labour productivity. Simulation results show that all households with waged employment (N=9) in the baseline scenario would reduce this activity and reallocate labour to self-employment (Table 9). Nine households (75%) reallocate farm labour to self-employment while still developing the farm. Three households (25%) would increase their labour input into farming, thus further reducing their waged employment. Stopping agriculture causes that all available labour is reallocated to waged employment.

Table 9 Farm development and self-employment scenario: Changes in labour allocation

	Changes in SFH labour allocation with regard to …		
	farming	self-employment	waged employment
Rural Diversifier			
Bulgaria	+	+	-
Poland	+	+	-
Romania	-	+	-
Rural Pensioner			
Bulgaria	-	+	+-
Poland	-	+	-
Romania	-	+	+-
Farmers			
Bulgaria	-	+	-
Poland	+	+	-
Romania	-	+	+-
Rural Newcomer			
Bulgaria	-	+	-
Poland	-	+	-
Romania	-	+	-

Notes: +: Household allocates more labour to the activity than in the baseline scenario. -: Household allocates less labour to the activity than in the baseline scenario. +-: No changes in household's labour allocation compared to the baseline scenario.

5.3 Impact of policy measures on household's cash balance

Policy measures aim at changing production factor allocation thus inducing structural change. If SFHs adapt their labour allocation, it also impacts their expenditure and income patterns. For instance, an investment measure in combination with a loan will cause interest expenditures or stopping farming will change the costs for the household's food consumption basket. Whether investments into farming or self-employment are preferable can be evaluated by looking at the cash balances[15]. Table 10 shows the rankings[16] of the households' cash balances for the major types of households with regard to the respective policy measure. Table 11 summarizes the model results for all households.

[15] The household's cash balance is calculated as earned household net income (sum of net income from farming, self-employment, waged employment, unearned income such as social transfers and subsidies) minus net household expenditures (which includes expenditures for investments).

[16] Ranks condense simulation results by ignoring the absolute differences between the scenarios. Scenarios with the highest cash balance received a 1 and the scenarios with the lowest cash balance a 5.

For rural diversifiers, the best strategy would be to develop the farm and to start a self-employed income activity. Starting self-employment without farm development would be the second best strategy followed by farm development (Table 10). Rural pensioners would benefit most from the farm development strategy as they display a high subsistence share. Interestingly, stopping agriculture is the least favourable option for pensioners from a cash balance point of view. Farmers will be best off when further developing their farms. A combination of farm development and starting self-employment is the second best strategy. For rural newcomers, starting self-employment with or without investments into farming are preferable strategies. Stopping agriculture is the least preferable option.

Table 10 Ranking of development strategies with respect to household cash balances for each major household type and country

Scenario	Bulgaria	Poland	Romania	Median ranks
Rural diversifiers				
Baseline	4	3	4	4
Farm development	3	2	3	3
Start self-employment	2	5	2	2
Farm development and start self-employment	1	4	1	1
Stop agriculture	5	1	5	5
Rural pensioners				
Baseline	5	2	4	4
Farm development	4	1	1	1
Start self-employment	1	5	3	3
Farm development and start self-employment	2	3	2	2
Stop agriculture	3	4	5	4
Farmers				
Baseline	4	3	3	3
Farm development	2	1	1	1
Start self-employment	3	4	4	4
Farm development and start self-employment	1	2	2	2
Stop agriculture	5	5	5	5
Rural newcomers				
Baseline	4	3	3	3
Farm development	3	1	4	3
Start self-employment	2	5	2	2
Farm development and start self-employment	1	4	1	1
Stop agriculture	5	2	5	5

Table 11 shows that there are country specific effects that may alter the excellence of individual scenarios. For Bulgarian SFHs, strategies that involve starting a self-employed income activity result in the highest cash balances. Polish SFHs would do best with farm development strategies whereas self-employment would deteriorate the households' cash balances. Contrary to Bulgaria and Romania, stopping agriculture could be a feasible option in Poland. Romanian SFHs would improve their livelihoods most by combining farm

development and self-employment. If they concentrate only on self-employment this would reduce their cash balances. Continuing without investments neither in farming nor self-employment cannot be recommended and stopping agriculture is not a feasible option.

Table 11 Median ranks in development strategies with respect to household cash balances for countries and all simulated households

Scenario	Bulgaria	Poland	Romania	Median ranks for all simulated households
Baseline	4	3	3.5	3.5
Farm development	3	1	2	2
Start self-employment	2	5	2.5	3
Farm development and start self-employment	1	3.5	1.5	2
Stop agriculture	5	3	5	5

Results show that there are differences in the impact of policy measures on households' cash balances between to the major type of SFHs and country. Nevertheless, an attempt shall be made to generalise the simulation results. Farm development is a feasible general strategy for SFHs whereas early retirement cannot be recommended (Table 11). Starting a non-farm business, with or without farm development can be promising, but this is more country specific.

5.4 Impact of households' philosophy of life and constraints

The model takes household's philosophy of life and constraints that result from the availability of land and labour capacity for the three income activities explicitly into account. Households that exhaust their capacities are constrained and would, under less constrained conditions, further develop. Here, policy could intervene with targeted support. Households that use their capacities only to the defined minimum level, do this because of their philosophy of life or because a policy measure asks for it. Analysing whether a household is constrained gives insights into the dynamic and interactive arena of policy objectives and households' objectives.

Minimum levels for farming in hectare greater than zero in the baseline scenario indicate that the household has strong emotional ties to agriculture. Operating the farm at this minimum level indicates that the household would continue farming even at the expense of income losses. Ten (83%) out of twelve households mentioned a strong affinity to agriculture thus having a minimum activity level greater than zero hectare for farming.

Minimum levels for farming in scenarios that ask for farm development are policy induced. Operating the farm on this level shows that the household is doing it at the expense of income losses to fulfil the requirements for the farm investment support. In the farm investment scenario only the Polish rural diversifier household would operate its farm at the minimum level. In the scenario that combines farm development with self-employment; seven households (58%) would continue farming at the minimum level. All rural newcomers are in this group but no farmers.

Households that operate their farms at the upper bound of hectares would like to further grow but are constrained by their land capacities. Here, policy could support structural change by

fostering the land market. Table 12 shows that many households are constrained but that especially farmers would like to grow further. The high number of households that are constrained under the baseline scenario shows that even without policy support structural change could take place when the households would have access to land.

Table 12: Households with binding upper bound for the farming activity

	Baseline	Farm development	Start self-employment	Farm development & self-employment
Rural Diversifier				
Bulgaria	*	*	*	*
Poland				
Romania	*			
Rural Pensioner				
Bulgaria	*			
Poland				
Romania	*			
Farmers				
Bulgaria	*	*	*	*
Poland	*	*	*	
Romania	*		*	
Rural Diversifier				
Bulgaria	*	*		
Poland				
Romania				

Note: The households marked with a '*' use the upper bound of their hectare capacity and would choose to grow if the bound could be shifted outwards.

Starting a non-farm business asks for a minimum household capacity of labour of 900 hours[17]. Households that invest only the minimum labour into self-employment do it because the policy measure asks for it. These households would be better off without investing into non-farm self-employment. Results show that three households (25%), the Polish rural diversifier, the Polish rural pensioner and the Romanian farmer invest only the minimum labour requirements into self-employment (Table 13).

Household preferences for waged employment may cause that labour is allocated to this activity although this would result in a lower income. Scenarios in which wage jobs are only done up to the defined lower level are constrained by their preferences. Results show that this occurs only in few cases. When farm investments are combined with starting a self-employed activity, the Romanian rural diversifier and farmer and the Polish rural newcomer reduce their labour input in wage employment to its minimum. The latter household would also do so when starting a self-employed activity without developing the farm.

Simulation results show that households' labour capacity for farming is sufficient for most households under most scenarios. Only the Bulgarian rural pensioner and the Romanian farmer are labour constrained in the baseline scenario. The latter household is also labour constrained under the farm development scenario. Considering the fact that agriculture has

[17] One exception was made. The Polish pensioner got a minimum level of 548 hours due to its low educational level. This equals the stated labour capacity of the best educated household member.

been serving as a social buffer in transition countries and the resulting highly inefficient labour use, this result is not surprising but confirms what is already well known.

Households that use all their labour capacity for self-employment are constrained due to age, education or lacking household labour. With support, these households could employ paid labour thus reducing rural unemployment. Six households (50%) are constrained in the self-employment scenario. When the farm is also to be developed, which implies that labour from other activities is shifted into farming, only two households (17%) remain labour constrained for self-employment (Table 13).

Table 13: Households doing self-employment on their minimum level or using all their labour capacities for self-employed activity

	Self employment at minimum level [1)]		Using all available labour for self-employment [2)]	
	Start self-employment	Farm development & self-employment	Start self-employment	Farm development & self-employment
Rural Diversifier				
Bulgaria				
Poland	*	*		
Romania			*	
Rural Pensioner				
Bulgaria				
Poland [3)]	*	*	*	*
Romania			*	
Farmers				
Bulgaria			*	
Poland			*	
Romania	*	*		
Rural Diversifier				
Bulgaria				
Poland				
Romania			*	*

Notes: 1) *: These households use only the minimum level of own household labour for self-employment, which implies that they do it only because of the policy measure requirement.
2) *: These households engage in self-employment up to the household labour capacity which implies that they are labour constrained.
3) Due to the low educational level, self-employment is a rather unrealistic scenario for this household. The labour capacity of the household member with the better education is by far lower than the minimum levels for self-employment generally set in these scenarios for other households. Therefore, for this household the minimum level was set at the same value as the upper bound (labour capacity).

6 CONCLUSION

SFHs have persevered in Central and South-eastern Europe. An outlook on future perspectives of SFHs asks for reliable information on the phenomenon of SFHs and the impact of policy measures on their development options: (1) intensifying farming, (2) diversifying income creating activities, or (3) exiting farming. This article focuses on the perspectives and challenges of SFHs with regard to rural non-farm employment (RNFE). It

summarizes the existing definitions with regard to SFHs and provides an overview of the role of the semi-subsistence agriculture in the EU12. This is followed by a concise outlook on RNFE as livelihood strategy for SFHs in general and specifically in the EU12. On the basis of a comparative 2007-survey of 489 SFHs in Bulgaria, Poland and Romania, three countries with particularly many SFHs, four major types of SFHs (rural pensioners, farmers, rural diversifiers, rural newcomers) were identified. For policy analysis, a multiobjective linear programming household model was developed. In the model, household labour could be devoted to (1) farming, (2) self-employment and (3) waged employment. The policy scenarios reflect different development options for SFHs: (1) farm development, (2) start self-employment, (3) farm development and start self-employment, and (4) stop agriculture.

The definition of subsistence farming adopted here refers to the economic size of the farm households. If a farm household lies between 1 and 4 ESU, it is called a semi-subsistent household. In the EU12, 25.5% are between 1 to 4 ESU. Nevertheless, these SFHs do not form a homogenous group and their livelihood strategies may differ. It can be generally said, however, that non-farm employment is an integral part of rural livelihood strategies, not just of the smaller but also the larger farms. Overall, the non-farm sector accounts for around 40-60% of rural household income all over the world. It could be observed too that rural regions with a higher degree of non-farm employment are generally among the economically better-off regions. Thus it does not surprise that non-farm employment if often propagated as a cure to poor livelihoods of SFHs.

Yet, the heterogeneity of SFHs and their reluctant response to policy measures call for more differentiated research. Therefore, a comparative cross-country survey in three countries (Bulgaria, Poland and Romania) with a genuine population of SFHs (19-27%) was conducted. The results suggest that policy can influence structural change among the SFHs but fine targeting to the various types of semi-subsistence households is a precondition for success.

Presently, **rural diversifiers** are not doing extremely well but they earn sufficient income from farming and often waged employment to cope. Given that they are on average relatively well educated, it is reasonable to assume that this major SFH type can keep its status quo until retirement, particularly since retirement is near for the majority (average age of 54 years). The recommendation would be to leave them alone but prepare the ground for them to enjoy a poverty-free retirement. SFHs classified as **farmers** (with on average more than seven hectares of land) possess the biggest development potential. Even now, without additional policy measures these households are mostly in a comparably good situation. Nevertheless, the farm investment measure could help them grow and prosper further. Yet, the average age of farm owners is quite high at 50 years. Thus, for this type of SFH the question of how to make the farm attractive to a potential successor and/or pension program are also important issues to be addressed. Overall, sectoral policy measures can greatly benefit this type of SFH. Similarly to the group of farmers, **rural newcomers** should be targeted by policy measures. They are relatively young but lack professional training in the farm as well as in the non-farm sector. Their employability is rather limited. If they continue as they do at present, their socio-economic situation will further degrade. It would be in their best interest, on the one hand, to improve their employability in the non-farm labour market. On the other hand, agricultural training would be needed to make their farms economically successful. Finally, it should be said that even without policy interventions structural change will proceed slowly (42% of the SFHs would change their labour allocation).

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Appendix-Table 1: Descriptive statistics of major SFH clusters, variable 1-8

	P_5 [1]	Median	P_{95} [2]	N	Mean rank/ Sig. [3]
1. Dependency ratio (ratio)					
Rural diversifiers	0.00	0.00	1.00	150	209.71
Rural pensioners	0.00	1.00	3.00	83	332.07
Farmers	0.00	0.00	1.50	153	224.31
Rural newcomers	0.00	0.33	1.90	103	256.97
Sample	**0.00**	**0.33**	**2.00**	**489**	***
2. Highest formal schooling in the household (scale) [4]					
Rural diversifiers	4.0	5.0	7.0	150	337.96
Rural pensioners	2.0	4.0	6.0	83	212.25
Farmers	2.0	4.0	6.0	153	207.68
Rural newcomers	2.0	4.0	6.0	103	191.45
Sample	**2.0**	**4.0**	**6.0**	**489**	***
3. Agricultural qualification of farm operator (scale) [5]					
Rural diversifiers	1.0	1.0	5.0	150	249.06
Rural pensioners	1.0	1.0	4.0	82	194.49
Farmers	1.0	2.0	4.0	151	275.33
Rural newcomers	1.0	1.0	4.0	103	227.76
Sample	**1.0**	**1.0**	**5.0**	**486**	***
4. Age of farm operator (years)					
Rural diversifiers	34.6	54.0	66.0	150	274.56
Rural pensioners	47.8	65.0	75.8	83	400.22
Farmers	32.6	50.0	63.0	151	228.48
Rural newcomers	23.0	35.0	57.4	103	96.35
Sample	**28.0**	**52.0**	**69.0**	**487**	***
5. Farm operator's experiences as farm manager (years)					
Rural diversifiers	4.0	16.0	32.8	150	239.50
Rural pensioners	5.0	17.0	40.0	83	295.99
Farmers	6.0	18.0	33.0	151	299.62
Rural newcomers	2.0	9.0	20.0	103	127.13
Sample	**3.4**	**16.0**	**34.6**	**487**	***
6. Share of non-farm net income (self-employment plus dependent employment) in household net income (percent)					
Rural diversifiers	29.70	65.79	96.29	128	330.52
Rural pensioners	0.00	0.00	61.68	76	122.29
Farmers	0.00	0.00	72.11	136	168.49
Rural newcomers	0.00	26.07	76.96	86	191.13
Sample	**0.00**	**30.56**	**89.70**	**426**	***
7. Share of own used agricultural production in total agricultural production (percent)					
Rural diversifiers	33.03	68.65	94.89	134	323.69
Rural pensioners	31.03	64.56	95.28	79	291.15
Farmers	0.74	38.84	76.71	149	162.08
Rural newcomers	4.12	40.89	81.99	101	167.23
Sample	**6.00**	**53.05**	**90.68**	**463**	***
8. Share of own used agricultural production in total agricultural production (percent)					
Rural diversifiers	33.03	68.65	94.89	134	323.69
Rural pensioners	31.03	64.56	95.28	79	291.15
Farmers	0.74	38.84	76.71	149	162.08
Rural newcomers	4.12	40.89	81.99	101	167.23
Sample	**6.00**	**53.05**	**90.68**	**463**	***

Note: See continuation of Appendix-Table 1 on next page.

Appendix-Table 1 (cont.): Descriptive statistics of major SFH clusters, variable 9-13

	P_5 [1)]	Median Percent	P_{95} [2)]	N	Mean rank/ Sig. [3)]
9. Share of own used agricultural production in total agricultural production (percent)					
Rural diversifiers	33.03	68.65	94.89	134	323.69
Rural pensioners	31.03	64.56	95.28	79	291.15
Farmers	0.74	38.84	76.71	149	162.08
Rural newcomers	4.12	40.89	81.99	101	167.23
Sample	**6.00**	**53.05**	**90.68**	**463**	***
10. Household cash balance (EUR)					
Rural diversifiers	-4,822.10	-725.28	3,353.50	150	249.68
Rural pensioners	-5,239.47	-1,047.78	1,069.66	83	224.30
Farmers	-5,344.44	70.04	5,725.67	153	286.22
Rural newcomers	-8,428.44	-1,906.74	3,239.40	103	193.64
Sample	**-6,139.27**	**-883.23**	**4,098.24**	**489**	***
11. Economic farm size (EUR)					
Rural diversifiers	516.05	2,824.54	6,642.22	150	220.93
Rural pensioners	191.35	1,656.40	5,293.30	83	137.31
Farmers	860.68	4,667.86	10,365.97	153	319.93
Rural newcomers	-94.90	3,206.85	9,275.84	103	255.51
Sample	**363.84**	**3,132.63**	**8,783.93**	**489**	***
12. Cultivated agricultural area per household (ha)					
Rural diversifiers	0.05	3.07	10.16	150	217.23
Rural pensioners	0.04	1.08	8.18	83	159.20
Farmers	2.01	7.04	13.12	153	357.22
Rural newcomers	0.00	2.66	8.40	103	187.89
Sample	**0.03**	**3.60**	**11.58**	**489**	***
13. Share of crop production in total agricultural production (percent)					
Rural diversifiers	8.93	39.77	79.26	150	228.94
Rural pensioners	2.46	32.74	72.82	83	192.18
Farmers	25.44	54.97	100.00	152	323.73
Rural newcomers	0.00	30.48	89.12	103	192.40
Sample	**0.24**	**43.44**	**99.76**	**488**	***
14. Number of agricultural products (number)					
Rural diversifiers	9.0	17.0	24.0	150	344.87
Rural pensioners	6.2	14.0	22.8	83	281.87
Farmers	2.0	10.0	18.0	153	168.97
Rural newcomers	2.2	10.0	18.8	103	182.79
Sample	**3.0**	**13.0**	**22.0**	**489**	***
15. Share of social security benefits in net household income (percent)					
Rural diversifiers	0.00	10.51	51.34	147	184.03
Rural pensioners	29.31	64.56	95.23	59	384.93
Farmers	0.00	8.31	59.08	143	185.66
Rural newcomers	0.00	18.90	77.02	88	220.34
Sample	**0.00**	**17.56**	**76.66**	**437**	***

Source: Fritzsch, Wegener and Buchenrieder (2008).

Notes: [1)] 5th percentile.

[2)] 95th percentile.

[3)] Significance levels of Kruskal-Wallis test: * 10%, ** 5%, and *** 1%.

[4)] 0: no studies and cannot read or write, 1: no studies but can read and write, 2: elementary school, 3: vocational school, 4: secondary school, grammar school, 5: other occupation-specific higher education, 6: B.Sc., 7: M.Sc., 8: post graduate studies, 9: Ph.D. [5)] 1: none/only practical experience, 2: only short courses, 3: agricultural vocational school, 4: agricultural secondary school, 5: agricultural graduate studies, 6: post graduate studies.